"WRITTEN SO YOU CAN UNDERSTAND IT."

POPULAR MECHANICS

An Illustrated Weekly Review of the Mechanical Press of the World

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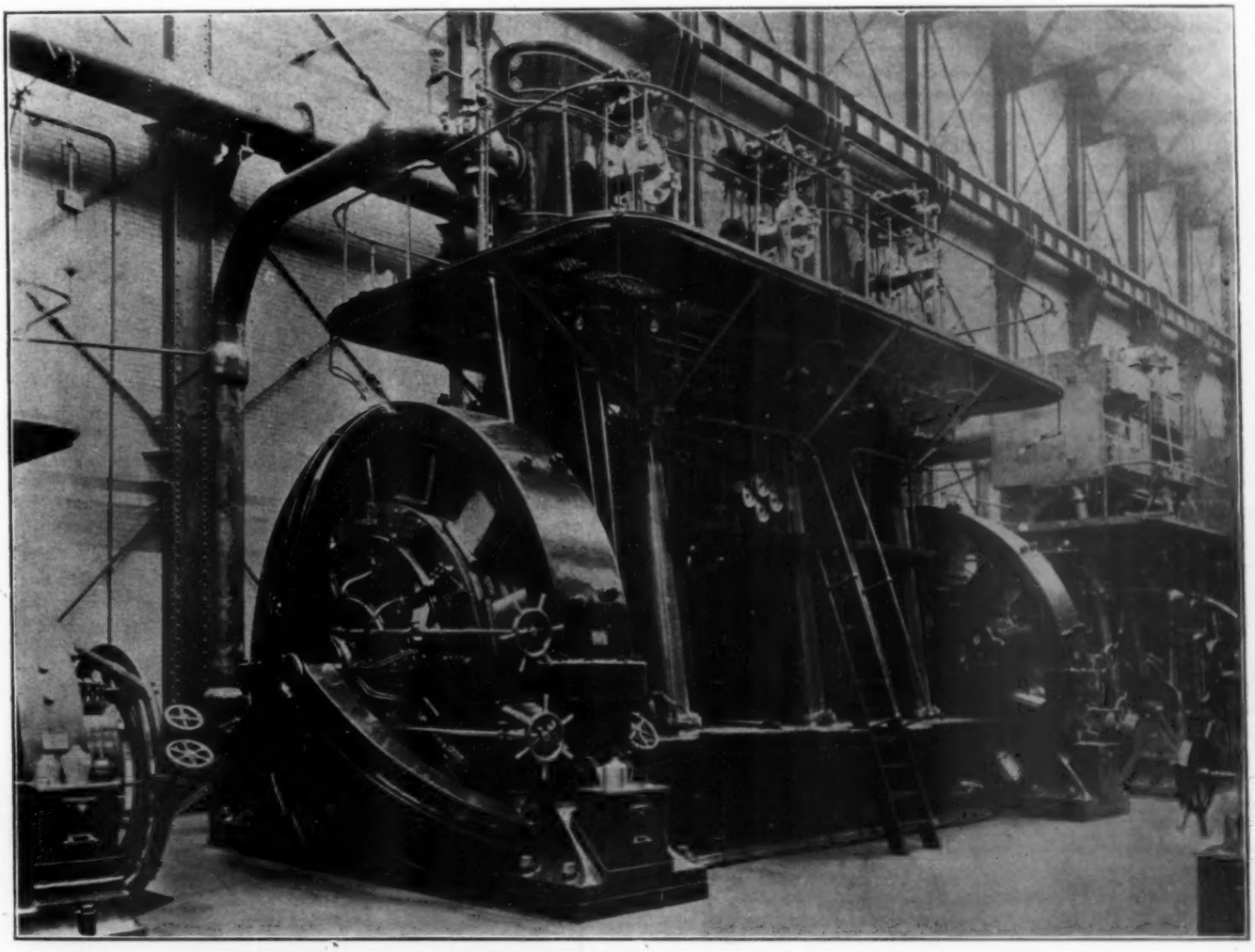
POWER PLANT THAT LIGHTS CHICAGO



A THREE-WIRE, 800-K.-W. UNIT IN THE HARRISON STREET STATION OF THE CHICAGO EDISON COMPANY

IN THIS ISSUE:

German Process May Revolutionize Brick Making.
Electricity for Boys—Making a Motor.
Mechanics for Boys—Making a Boat.
Shop Kinks—An Ingenious Pipe Repair.
How Electric Heaters Are Made. Part I.
Submarine Electric Light.
Machine for Driving Railroad Spikes.
Pea Flour—A New Foodstuff.
Automobile to Run on Rails or Ground.
How to Make a Slot Machine.
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SMITHSONIAN DEPOSIT.

MONSTER PLANT FOR MAKING ELECTRICITY.

Capacity of 27,000 Kilowatts—One Unit Alone is of 3,500 Kilowatts.

The Harrison street station of the Chicago-Edison company is one of the most powerful electrical generating plants in the world. When the engines and generators now being installed are completed, the station will have the enormous capacity of 27,000 kilowatts. This company also boasts of the largest storage battery installation in the world, the latter of which is located in the central district station.

The generating equipment of the Harrison street station is described by the Electrical Review in an exhaustive article on the Chicago-Edison company, January 11. It includes two double-current and two direct current units, each consisting of two 200-kilowatt generators, coupled to the two ends of a triple-expansion, vertical marine-type engine, running at 150 revolutions per minute. The three-wire 800-kilowatt unit is shown in the accompanying illustration. In addition to these units there are six 1,200 horse-power sets, generating direct current. One of these sets was exhibited at the Chicago World's Fair and regarded as a monster among electrical generators. At the end of the room is one double current generator of 2,500 kilowatts capacity normal rating and 3,200 kilowatts, three-hour, overload rating. This gigantic machine gives 300 volts on the direct current side and 6-phase, 25-cycle current on the alternating current side, when running at 75 revolutions per minute. The collector rings for taking off the alternating current are 90 inches in diameter and each carries 48 brushes. The armature is 21 feet 8 inches in diameter and the commutator is 15 feet in diameter and has 960 bars. The machine has 40 poles and in all 560 brushes bear on the commutator. A 75-ton flywheel is mounted on the armature shaft to steady the rotation of the machine. The engine has cylinders 38 and 84 inches in diameter by 60-inch stroke and has a maximum of 5,000 horse-power.

Alongside of this mammoth unit still a larger one is being erected, the new machine being a 3,500 kilowatt alternator generating directly three-phase current 9,000 volts with a frequency of 25 cycles.

UNIFORM DESIGN OF CHICAGO YACHT CLUB'S NEW BOATS.

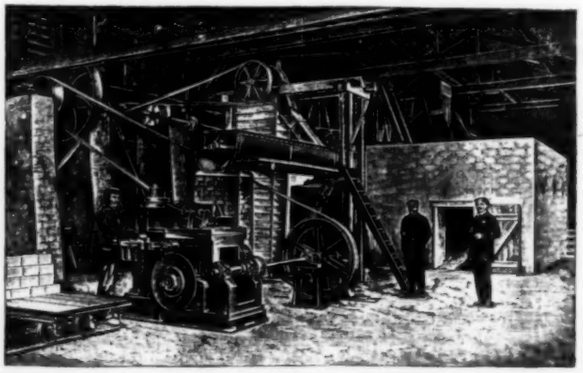
Edward Rosing and John B. Berryman have nearly completed their labors on the new one-design fleet for the Chicago Yacht club. The boats are ideals of grace and it is thought will es-

tablish some new lake speed records. The boats will be 24 feet over all and 15 feet on the load water line. They will have 7 feet beam, 5 feet on the transom. The least free-board will be 14 inches. The free-board at the bow will be 1 foot 9 inches and at the stern 1 foot and 3 inches.

BRICK MADE OF SAND AND LIME.

German Process Which May Revolutionize the Industry.

A new process for making all kinds of building brick from common sand and lime has been patented in Germany, and is now being introduced here. Instead of requiring 10 days to make, the sand brick is ready to use in 12 hours, and the older it grows the harder it becomes. Some scientists now believe that the great pyramids were made in this manner, and that instead of the builders bringing great blocks of stone weighing many tons from distant quarries, the sand of the desert constituted the chief element in their constructions, and that these

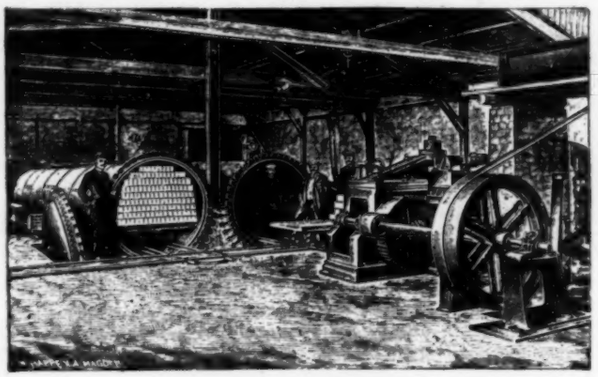


BRICK PRESS IN ACTION.

mammoth pieces of what now appears to be stone are in reality hand made sand bricks of enormous proportions.

However this may be there is abundant evidence that the common sea or bank sand is capable of a wonderful and rapid transformation and by a process comparatively simple.

The 94 to 96 parts of sand is placed in an iron mixer which revolves by steam power and from 4 to 6 parts of ordinarily good quality lime is added. The lime is first ground quite fine in a mill. The measuring of the sand and lime is done by the machine automatically. From the mixer the material runs in a steady stream into a brick press, also operated by power and capable of exerting great pressure. By changing the dies and



LOADING INTO CYLINDERS.

mould of the press different sizes and shapes are made. As the brick come from the press they are stacked on small iron cars holding several hundred each, and by means of an iron track are run into a big iron cylinder holding from 10,000 to 20,000 brick. The bricks remain on the cars. When the cylinder is full the end is fastened tightly and steam at a high pressure, fed by previously deposited chemicals is turned in. For 12 hours the brick are subjected to this treatment during which a chemical change has occurred. The hydrated lime and the

silicic acid of the sand combine to form a silicate of lime which give to the brick its hardness and waterproof qualities.

The cars are now run out, and the brick are ready to be hauled away and used. It is asserted that they will continue growing harder for several years. Experts say that heat or cold, wet or dry weather or sudden changes in temperature of the most extreme character have absolutely no effect upon these brick.

The cost of a plant to make 13,000 brick a day is about $14,000 and the cost of production is said to be much less than where clay is used as now universally employed. The process is known as the Huennekes System.

HOW THE FAMOUS VIÇH SAUSAGES ARE MADE.

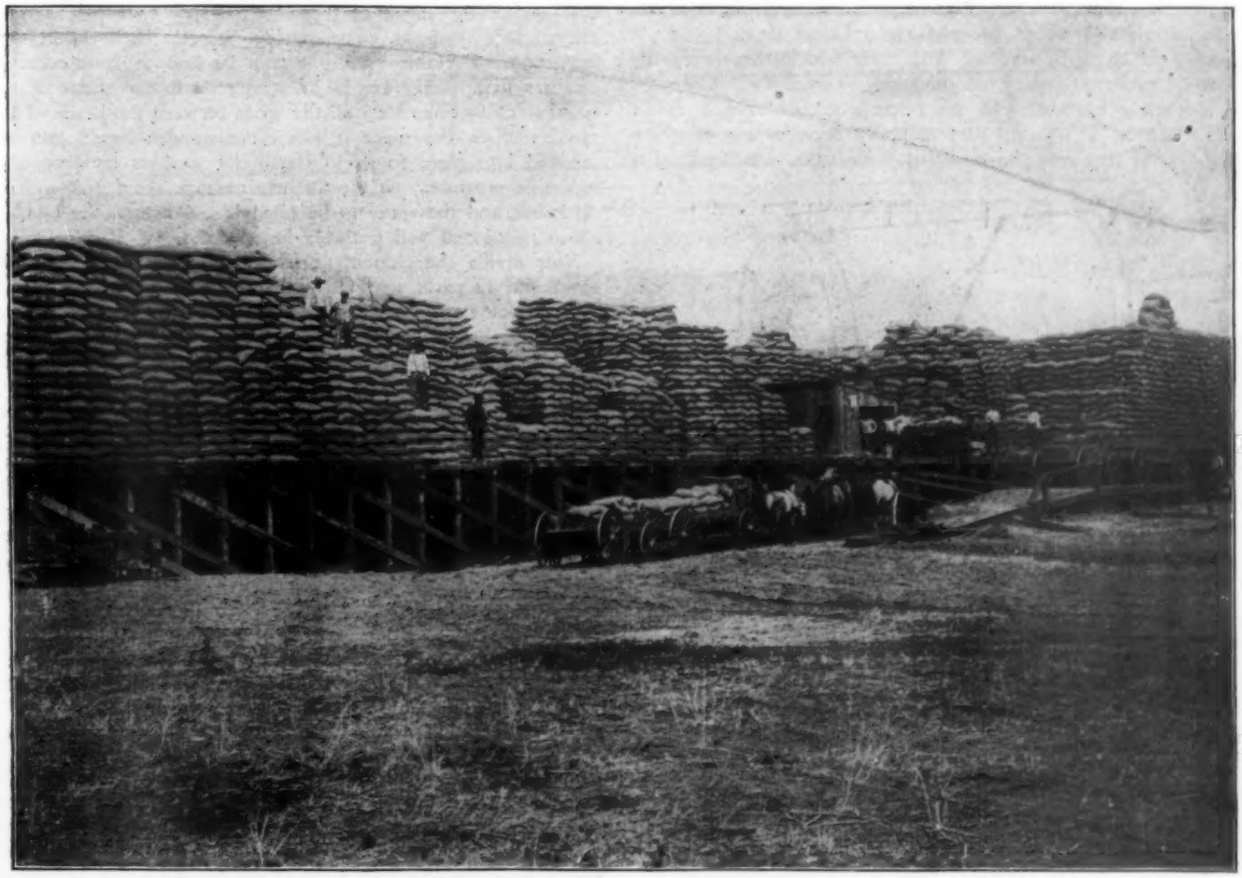
Probably the finest sausages in the world are made in the old town of Vich, Spain. Consul-General Julius G. Lay at Barcelona reports: "The genuine Vich sausages, famed throughout Spanish-speaking countries, are prepared exclusively from lean pork and a small quantity of bacon, without admixture of any other kind of meat. As the sausages are made they are placed on tables and wrapped in clean cloths, in order to extract any excess of moisture. After a few hours they are hung in the drying room, care being taken that each sausage hangs separately, to get the benefit of the circulation of air.

The sausages made here are supposed to acquire a special flavor which distinguishes them from those made in other parts. This peculiarity is not due to any special preparation, but is apparently gained during the process of drying, as sausages prepared in other districts and brought to the plain of Vich to be dried acquire the same distinguishing aroma. The estimated annual output of the Vich factories is valued at nearly $1,000,000.

IT MEANS FORTUNES TO THE WHEAT GROWER.

Chinese Are Acquiring a Taste for Flour Bread and Millers Are Jubilant.

The dream of the American wheat grower is being realized. The inhabitants of China are learning to eat flour bread. This has been the one bright hope that has urged on the wheat farmers of the United States to battle against many vicissitudes for generations. It has become a byword: "When the Chinese eat wheat for breakfast, the wheat farmers of America will wear diamonds."



A PILE OF 141,000 SACKS OF WHEAT WAITING SHIPMENT NEAR PENDLETON, ORE.

Several of the leading millers of the state of Washington have just returned from the Orient and have succeeded in establishing trade relations that are most encouraging. It probably means that wheat flour may serve to feed the swarming millions of the Orient.

An especial effort to the accomplishment of this end has been put forth this year because of the enormous crop of the Pacific Northwest, which was by far the largest in its history. Puget Sound recently shipped 1,037,000 barrels of flour and Portland 792,000 in the Trans-Pacific trade. Washington, Idaho and Oregon produced 53,310,000 bushels of wheat last year. Washington takes the lead with 33,000,000 bushels, says the Four-Track News, 10,000,000 more than were ever raised in the state before. Oregon produced 6,500,000 more than its previous record yield. Idaho sent out 4,000,000 from two counties. About $21,200,000 has been paid to the producing farmers in the three states for their crop.

The total vacant land in the United States unappropriated and unreserved is 914,096,974 acres.

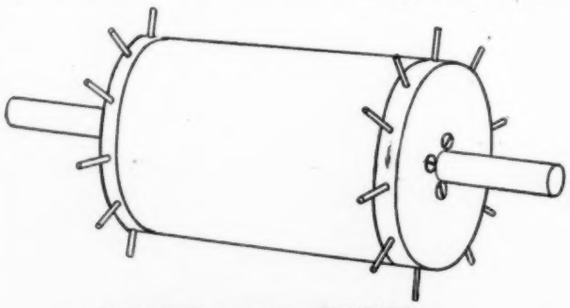
Easy Electrical Experiments FOR BOYS

By L. P. Dickinson

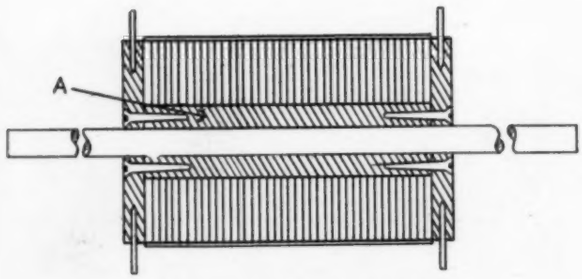
CHAPTER XIII.

HOW TO MAKE 1-20 HORSE POWER MOTOR. THE ARMATURE CORE.

This and the following chapters will deal with the construction of a small motor designed for practical service, and yet capable of being constructed with tools which boys ordinarily possess, except in one or two instances where a little lathe work is absolutely essential. In the construction of such a motor the armature, or rotating part naturally occupies our attention first. It is to be of the so-called drum type, consisting of a



ARMATURE CORE, FINISHED



SECTION THROUGH CENTER

large number of coils of wire wound lengthwise over a cylindrical core of soft iron which is held upon a shaft.

The first thing to provide for is the shaft. It should be made of a piece of steel rod ¼ inch in diameter, cut to a length of 8½ inches. Rods of this diameter and material may be bought at an ordinary hardware store, and may be cut to the desired length by means of a file.

Upon this shaft is to be mounted a cylinder of hard wood. Its outside diameter is ⅝ inch and its length is 2½ inches. It must fit the shaft very tightly so that it will not turn upon the shaft when the full force of the finished motor is applied to it. To avoid splitting the cylinder in thus forcing it tightly upon the shaft, it is better to make the cylinder by boring a hole lengthwise through a rather large block of wood, forcing the block upon the shaft, and then turning down the block until it is of the right diameter. This cylinder is shown at A in the figure below. It should be so placed that one end of the cylinder is 3¼ inches from the corresponding end of the shaft. Make two circular pieces of hard wood 3-16 inch thick, 1¾ inch in diameter, with a ¼-inch hole in the center of each. These pieces are to be slipped upon the shaft until they lie against the ends of the wooden cylinder already constructed, and are screwed to the latter by four flat headed brass screws ¾ inch long and as slim as can be secured. The heads of these screws should be counter sunk below the surface of the wood. There has now been formed a wooden spool, mounted upon a shaft, the heads of the spool being removable. Its appearance will be clear from an inspection of the figure. The space between the heads of the spool is to be filled with iron. For this purpose iron washers are the best to use. Procure at a hardware store about 40 iron washers 1¾ inches in external diameter with a hole through the center ⅝ inches in diameter. This is a size which is quite common, and the above dimensions are given for that reason. If, however, the size of the hole should vary considerably from the above, it will do no harm provided the diameter of the shank of the wooden spool upon the shaft be altered to correspond. The outside diameter is, however, very important. For this reason it may be best to purchase the washers first. They are to be strung on to the shank of the spool so as to completely fill the space between the heads of the spool. When the space is filled, the wooden heads can be screwed into place so as to clamp the washers together with moderate pressure. As the washers average about 1-16 inch in thickness, and the space to be filled is 2½ inches, the number above mentioned will probably be needed.

Now divide the circumference of the heads of the wooden spool into 12 parts, marking each division point with a pencil. Procure some small brads ⅝ inches long. With a pair of pliers cut off the heads of these brads. Now drive them into the circumference of the wooden discs, twelve in each head, equally spaced, projecting ¼ inch from the spool and pointing directly toward the center of the shaft. The projecting brads on one end must lie directly in line with those upon the other end. They are for the purpose of holding the coils of wire which are to be wound upon the core. Before this is done, however, the core must be covered with a layer of heavy paper glued smoothly in place in order that the coils of wire may not by any chance touch the iron core. The shaft also should be wrapped around with a layer of stout paper for a distance of one inch from each end of the core.

(Continued next week.)

AMOUNT OF WIRE REQUIRED FOR ELECTRICAL EXPERIMENTS.

As numerous inquiries have been made to us as to the amount of wire required for the electrical experiments thus far described, the following estimates are given. All magnet wire whose number is below No. 30 should be double cotton covered. All wire whose number is above this should be double silk covered. An effort has been made to use the same size of wire as far as possible in similar experiments, so that any wire left over from one experiment may be used in those which follow:

Simple Galvanometer, Chap. 2.....1½ oz. No. 24
Tangent Galvanometer, Chap. 4.....8 oz. No. 16
Magnet, Chap. 5.....16 oz. No. 18
Induction Coil, Chap. 6.....8 oz. No. 18, 4 oz. No. 36
Simple Motor, Chap. 7.....3 oz. No. 24
Voltmeter, Chap. 9.....1 oz. No. 32
Telephone, Chap. 12.....1 oz. No. 36

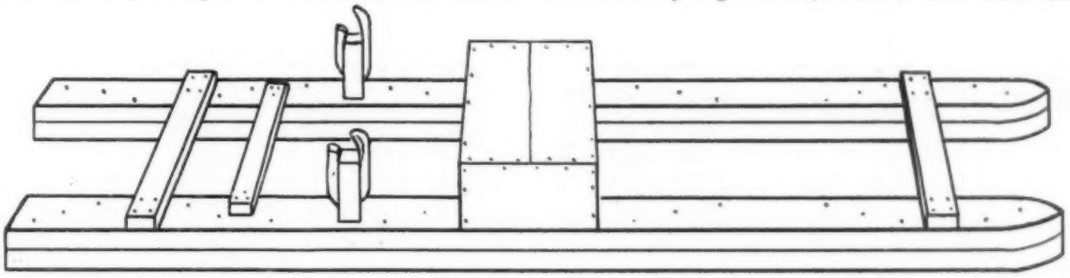
L. P. D.

Kaiser Wilhelm is an expert at ping pong. Prince Henry does not play the game so well. The Kaiser therefore warned his brother during his visit here not to play the game in America. He said to him: "If you play ping pong you will lose, and Germany's prestige in the great country you are visiting will be considerably damaged.

E. G. Whitney of Rocky Ford, Col., has made an offer to the Public Land and Buildings Board of Nebraska, to keep that state wet all next summer for the modest sum of $1,000. He says he has long known the secret of producing rain but has waited in order to clear his mind of every doubt as to the success of his scheme.

HOW TO MAKE A BOAT FOR BOYS.

A safe, convenient and easily constructed boat for boys may be made with the aid of two logs, or heavy timbers, a box and a few boards or scantlings. Place the two logs or timbers about four feet apart on the ground. Connect them by a couple of strong cross pieces, as shown in the illustration. That the cross pieces be fastened more securely to the timbers it is better to attach them by boring holes in them and the timbers



A SAFE BOAT BOYS CAN MAKE.

with an augur, and driving pegs in the holes. The pegs should be driven in at each end of each cross piece. The oarsman's seat may be made of a box or boards as you desire. Make the oak locks by hollowing out a piece of thick board and fastening it securely to the timbers either by large nails or by sharpening the lower end and driving it into an augur hole. Brace the oar locks to the sides of the timbers and to the foot brace. The oars can be made of any kind of boards or strips. Such a boat to accommodate one boy may be made of a couple of railroad cross ties. By obtaining larger timbers it can be used by a number of boys. The device will give better service by sharpening the two main timbers in the front end.

IRRIGATION OF THOUSANDS OF YEARS AGO.

Discoveries Which Prove the Great Inferiority of Modern Civilization.

Thousands of years ago, it is claimed, there existed in New Mexico a system of reservoirs, irrigation and viaducts that is unparallelled at this age. This is proven beyond a doubt by discoveries and investigations that have recently been made. Under the lava which covers hundreds of square miles are found traces of cement ditches and reservoirs that are marvels of engineering.

In those days, says the Rural Californian, the deserts bloomed like a garden and a civilized race of millions occupied the arid Southwest. Our irrigation engineers have much to learn from the people older than the Pueblo race, who inhabited New Mexico when the race from which Columbus sprang were still barbarians. In those days reservoirs at convenient basins stored the water, which was led in cemented ditches across the loose soil to where it was needed for use. Chasms were crossed by viaducts. Into some of the ditches lava has run, showing their great antiquity. Others are covered with shifting sands, but enough are visible to enable skillful engineers to understand the system which modern civilization with its boasted attainments, has been incompetent to construct.

Wooden shoe pegs are used almost exclusively in the manufacture of shoes in Turkey, and their preparation is the basis of an extensive industry. They are manufactured by hand from pine wood in the most primitive manner.

The entire drink bill of the United States last year amounted to $1,273,212,386. Fifty per cent was for beer; 31 per cent for whiskey, 5 per cent for wines and 14 per cent for tea and coffee.

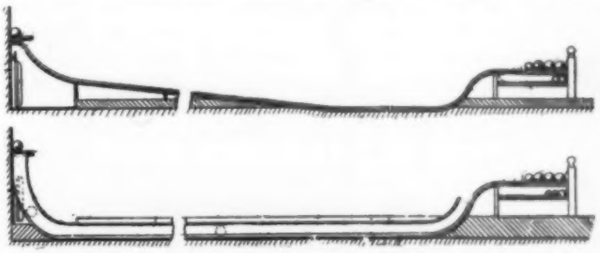
HEAT FROM THE EARTH AS A SOURCE OF POWER.

The possibility of utilizing the heat from the earth's center as a source of power was mentioned in the Feb. 22 issue of Popular Mechanics. Prof. Thomas C. Mendehall, the well-known authority on mechanics, is of the opinion that the heat might be converted directly into electricity without the intermediate use of steam. There is much, it is claimed, to commend this idea. If it be necessary to go down 8,000 feet to make water boil it would be necessary to go 2,000 more to generate steam at a useful pressure, say 150 or 200 pounds to the inch. Were some more volatile substance than water employed to produce the motive vapor, a lower temperature would suffice. As stated in the issue of Feb. 15, sulphur dioxide volatilizes at a much lower temperature than water does, and a sulphur dioxide engine might be run successfully at a depth of a mile.

Others have suggested that this source of power from the center of the earth might best be brought into use through the instrumentality of the thermo-electric couple, which will be explained in a succeeding issue.

IMPROVED BOWLING ALLEY.

Bowlers will appreciate the invention of Emil Reisky, of Rochester, N. Y., who has devised a new return for the balls. This return which is a circular tube may be wholly or in part



beneath the floor. In either case an unobstructed view is secured and there is no danger of the balls jumping the return trough.

Two Irishmen were riding in a suburban train, when the train whizzed through a tunnel. Just then a train rushed past in the opposite direction. One Irishman turned to the other one and said, "Mike, 'tis a grate invinshun, wan thrain runin pasht th' ither wan troo a hole in th' ground." "Shur ut is," says Mike, "but twud be a domned bad thing if wan av thim thrains wud miss th' hole."

Dr. Yama Kin, of San Francisco, enjoys the reputation of being the first Chinese woman doctor. She is also a pioneer in the cause of enfranchisement of women.

The following cheap way to blue small pieces of steel is recommended: Put core sand in a babbitt ladle; heat hot; put the work in and shake the ladle over the fire until the required color is obtained.

Popular Mechanics

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POPULAR MECHANICS

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AN INGENIOUS PIPE REPAIR.

In a certain boiler room were a pair of boiler feed pumps with suction pipes from three sources, and controlled by three valves. This network of pipes, valves and fittings were crowded into a space of two feet between the pumps and wall. With the exception of the flange joints at the pumps there were no unions, says a writer in Steam Engineering.

The accompanying sketch, Fig. 1, shows the general arrangement, but not all the piping referred to; between the tees marked A and B there was a piece of pipe without any kind of a union whatever, and these tees might be considered as immovable bodies, not having even a small amount of spring as is frequently met with in pipe work.

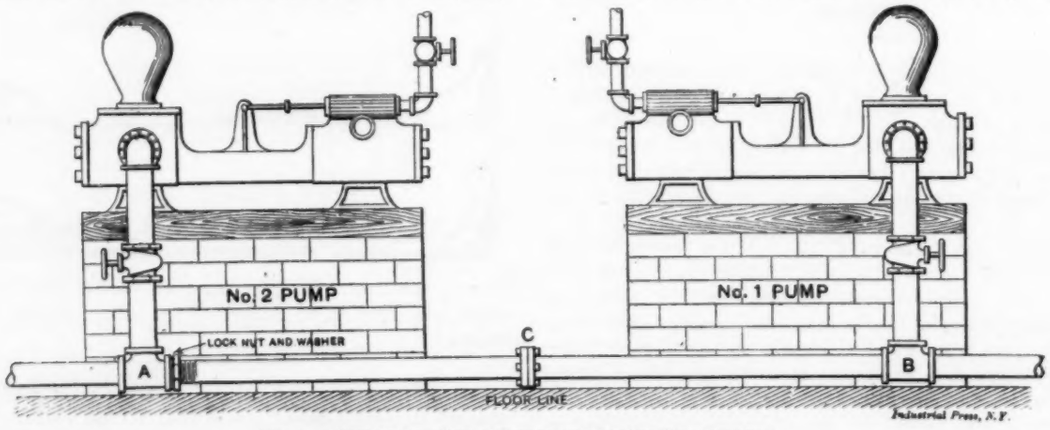


Fig. 1. Showing Location of Pumps and Suction Pipe Repaired.

One night the pipe split near where the flanges C now are. Of course repairs were in order; but, to get the split pipe out and a new one in, meant dismantling the entire piping, and beginning to unscrew where the pipe-fitter left off until the desired piece was reached. This method would cost considerable time. A bright idea came to the engineer.

First, he sawed the split portion of the pipe out, a piece about two inches long, and unscrewed the remaining pieces out from the tees. One of these pieces—that which enters into the tee marked B—he again threaded and screwed on a flange. The other piece being too short for further use in that place, was discarded, and a new piece of the proper length obtained. The new piece he threaded on one end to receive the mate of the flange on the other piece just referred to. At the other end he cut the thread up for a distance of about 4 inches.

His scheme required a lock nut and washer; the latter he easily obtained, but of the former the plant had none, so he sawed off the hexagonal end of an old globe valve and by running the pipe tap into it a little further than was originally done,

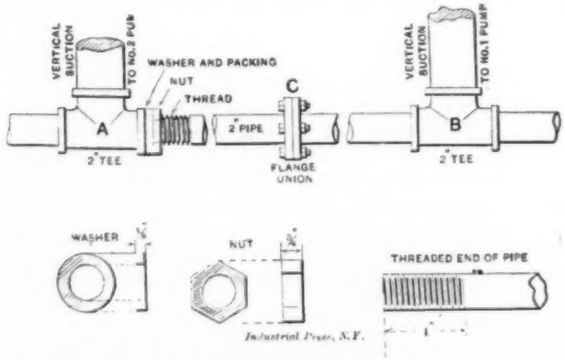


Fig. 2 Details of Pipe Repair

he made the required nut and screwed it on the threaded pipe end as far as it could go, and followed it with the washer.

This piece of the pipe was then screwed into the tee marked A to the full extent of the thread projecting beyond the nut and washer. This permitted the other piece being entered into the tee B and tightened up for good. The first piece was next backed out of A until its flange pressed against a rubber joint which had been cut for the purpose, and the flange on the other part of the pipe. A little careful manipulation of the pipes and rubber joint soon admitted of the both being entered and screwed up, making a tight joint.

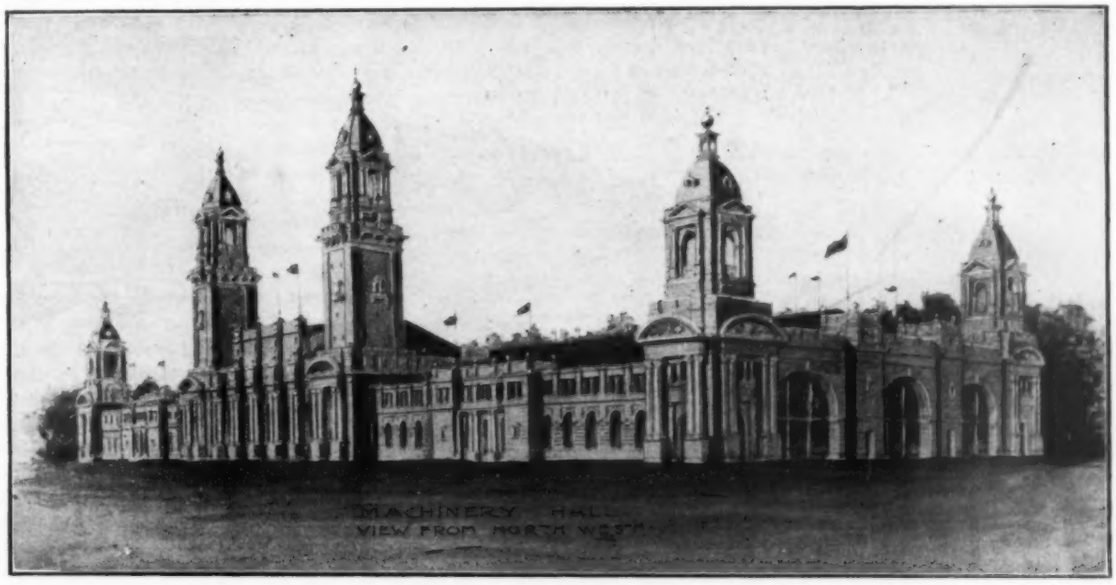
At the tee end of the pipe a piece of twine soaked in red lead paint was then wound around the thread in the direction of the move of the nut, which was finally set up against the washer which in turn squeezed the twine against the end of the tee and around the thread of the pipe. Just sufficient twine had been used to admit of a good pressure being brought to bear against it, and yet allow the washer to meet the tee, and so make a good tight joint.

This repair has held ever since. The engineer told me the entire job did not consume more than two hours of two men's time. The moral is put plenty of unions in your piping. Costs more at first, but saves later.

There will be no more Sunday funerals in Trenton, N. J. The coachmen of that city have decided not to drive at Sunday funerals. They are supported by the undertakers.

TO HOUSE A MAMMOTH POWER PLANT.

One of the most imposing structures at the Louisiana Purchase Exposition will be the Machinery building. It is to house the Exposition power plant, the largest power plant ever shown as an exhibit. The main entrance shows a triple arcade with flanking pavillions in the center. The north front of 1,300 feet has an arcade of nine arches as a center feature. The two axes of these center features are 160 feet apart. The east facade will show a comparatively low building centered by a gable and smaller entrance feature.



MACHINERY BUILDING.

TELEPHONE THROUGH THE EARTH WITHOUT WIRES.

Without wires and with instruments extremely crude, telephone messages were exchanged over a distance of 200 yards near Washington a few days ago. The instruments were the invention of Nathan Stubblefield, a Kentucky farmer and his 14-year-old son. They were made on the Stubblefield farm near Murray, Ky. The test was in the presence of a party of New Yorkers and some newspaper men. As there was but one single set of instruments, messages were only sent one way. In a house used as the sending station was an ordinary telephone transmitter mounted on a box containing dry cell battery and induction coils. Wires connected the telephone to two iron rods set outside in the ground to a depth of two feet. Six hundred feet distant was placed the receiver similarly connected to two iron rods set in earth, and set between them, connection being made with wires.

Words and sentences emitted from the receivers were distinctly heard. The operator in the house played popular airs upon a harmonica. The strains came through the receiver to the ear of the listener. Mr. Stubblefield explained that the invention simply harnessed the "electrical field," which scientists say is everywhere below the surface of the earth. The test was made over land and water, one instrument being placed in a boat, with equal success. The messages could not be heard distinctly at a greater distance than 200 yards, but this is believed to have been because of the crude instruments.

A cement for marble is made from plaster of Paris soaked in a saturated solution of alum. This must then be baked in an oven and ground fine in a mortar. A small quantity should be used with water as plaster. It sets hard and may be rubbed down like marble and polished.

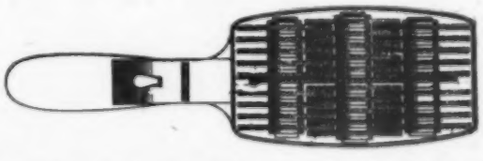
EARLY LONDONERS USED BONES FOR SKATES.

Fitzstephen, the earliest historian of London, tells of crude methods of skating in that early day: "When the great fenne of moore, which watereth the walls of the citie on the north side, is frozen, many young men play upon the yce. Some tye bones to their feete and under their heels and shoving themselves by a little picked staffe slide as swiftly as a bird flyeth in the air, or an arrow out of a cross-bow."

In 1642 Edinburg had started a skating club and was famous for its fine skaters. Blade skates were introduced into England from Holland in 1660 and were first seen in London in 1662. John Evelyn, the diarist, under date of Dec. 1, of that year, describes how "divers gentlemen performed before their majesties on the new canal at St. James park, with scheets, after the manner of the Hollanders." Roller skates were employed in Holland in 1770. In 1772 the first Englishr book on "The Art of Skating" was published by Robert Jones. Roller skates were introduced in a scene of Meyerbeer's "Prophet" in Paris in 1849.

PENNY-IN-THE-SLOT HAIRBRUSH.

We expect almost any day to go out and run into a machine on the corner where we can drop a nickel in the slot and get a hair-cut. Here is the next thing to it. A hair brush in



which you drop a penny to release a catch by means of which rows of bristles passing around wheels are set in motion. A swimming hole where small boys have been told not to go would doubtless be a good location for this affair.

New Zealand has an old age pension system, by which 12,405 people have received $1,059,820 in the three years of its existence.

Rice, raw eggs and venison are the easiest things to digest. At the other end of the scale are pork, cabbage and hard boiled eggs, which take four hours to digest.

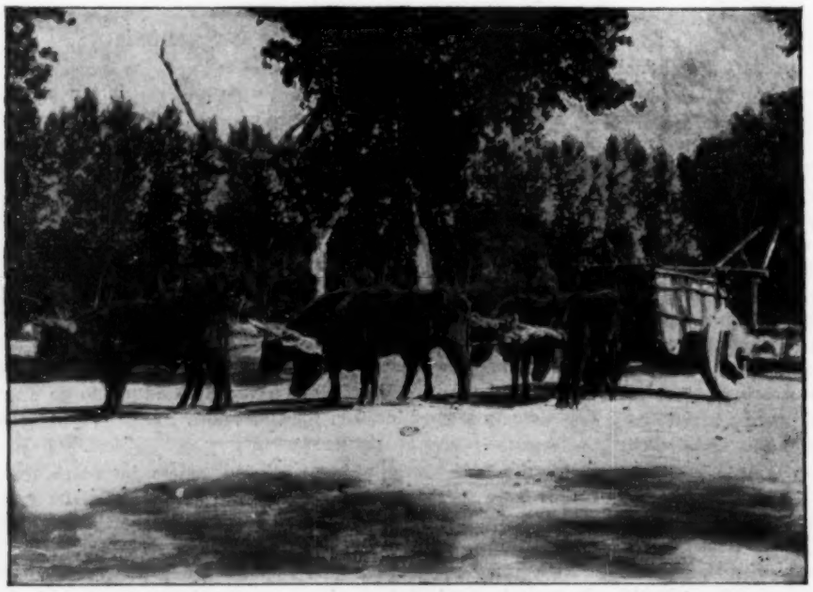
THE "AMERICANIZATION" OF MEXICO

Old Fashioned Farm Wagon Gives Way to Modern Conveyances.

American ideas have invaded Mexico to such an extent that they are revolutionizing the old customs to which the natives have adhered continuously for generations. In the accompanying illustration we show a Mexican farm team, yet a familiar sight in the rural districts of old Mexico. This vehicle is in striking contrast to the up-to-date automobiles that have recently made their appearance on the streets of the City of Mexico. The Mexican farm team is pictured by Raymond & Whitcomb, the famous tourists' agents, as one of the passing sights of historic and picturesque old Mexico. Several Mexican railroads, all of which are controlled by American capitol, are soon to be converted into standard broad gauge lines, the narrow gauge roads which now prevail having proved inadequate to the growing demand for more modern methods of freight and passenger traffic.

In the City of Mexico narrow and dirty streets are being superseded by broad asphalt avenues. More than 50 miles of electric street railroad have recently been built and 50 miles more will be in operation in a year. Street sprinkling carts are coming into use. A great drainage canal has been built to carry off the deluging rain falls of the rainy season. Shade trees are being planted. Modern business blocks of the American plan are being erected. The old patio style house—with a large court in the center around which are built the rooms—which is intended for hot countries and which is entirely unsuited to this climate, is being encroached upon by the compact American structure. The climate of the City of Mexico is probably the pleasantest and healthiest of any large city in the world. Its altitude of 7,472 feet above the sea level offsets its latitude. The mean annual temperature is 59.79 degrees F.; the month of May, the hottest of the year, has an average temperature of 64.58, and December, the coldest month, of 53.60. The population is 400,000. It is more compactly built and densely populated than any city of the United States. Of the foreign population there are 10,000 Spaniards, 4,000 Americans, 3,000 French, 1,500 English, 1,000 Germans and 400 Italians.

[Note.—We told of Mexican coffee and tobacco in the issue of Jan. 25. The next issue will contain an interesting article on the cost of living in Mexico.]



A MEXICAN FARM TEAM.

PEA FLOUR, A NEW FOODSTUFF.

Pea flour, with which the war department has recently been making experiments, will be pleced on the market in a short time for general use. Its qualities seem to commend it as a valuable new food product. The flour is to be mixed with wheat flour. It improves the quality of the bread, it is claimed, and causes it to remain soft and moist for a much longer time.

The pea flour, says the American Miller, is prepared for the market by cooking the peas with steam, then roasting them and finally powdering them by roller process. It is extremely nutritious and is said to contain two and one-half times as much of the substance that goes to make muscle and blood as does wheat flour. Nearly 59 per cent of the pea flour is starch and more than 28 per cent is flesh forming element with practically no water.

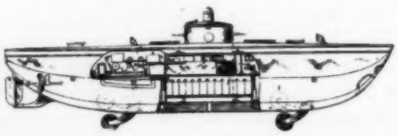
PORTABLE ELECTRIC LAMP TESTER.

An English firm which manufactures electrical apparatus has just brought out a portable electric lamp tester. By means of the instrument illustrated, all that is necessary is to remove the lamp from its holder and place it in that fixed to the

instrument, and to insert in the lamp-holder the plug attached to the flexible cord. The pointer will thereupon indicate the exact current taken by the lamp at the supply voltage upon which it is being run. With the instrument is provided a table whereby the efficiency of any lamp, in watts per nominal candle-power, can be at once found from a knowledge of the aproximate supply voltage, and a reading taken on the lamp tester. Another use to which this instrument can be put is to show at a glance whether a lamp of unknown candle-power is, say, an 8, 16 or 32; a question which is often difficult to determine by mere inspection.

SUBMARINE BOAT.

A patent has been granted a Bridgeport, Conn., man for a submarine boat the motive power being electricity carried in storage batteries. For travel on the



bottom of the ocean he has provided wheels. When he comes to a nice smooth stretch of sand, by attaching a few teams of seahorses the batteries can be saved for humpy places.

Cigars having the appearance and flavor of the genuine Havana article are made in Chicago out of American tobacco leaf through the aid of the "commercial microbe," a bacteria discovered in real Havana cigars, which is now being nourished on beef tea and raised in Chicago.

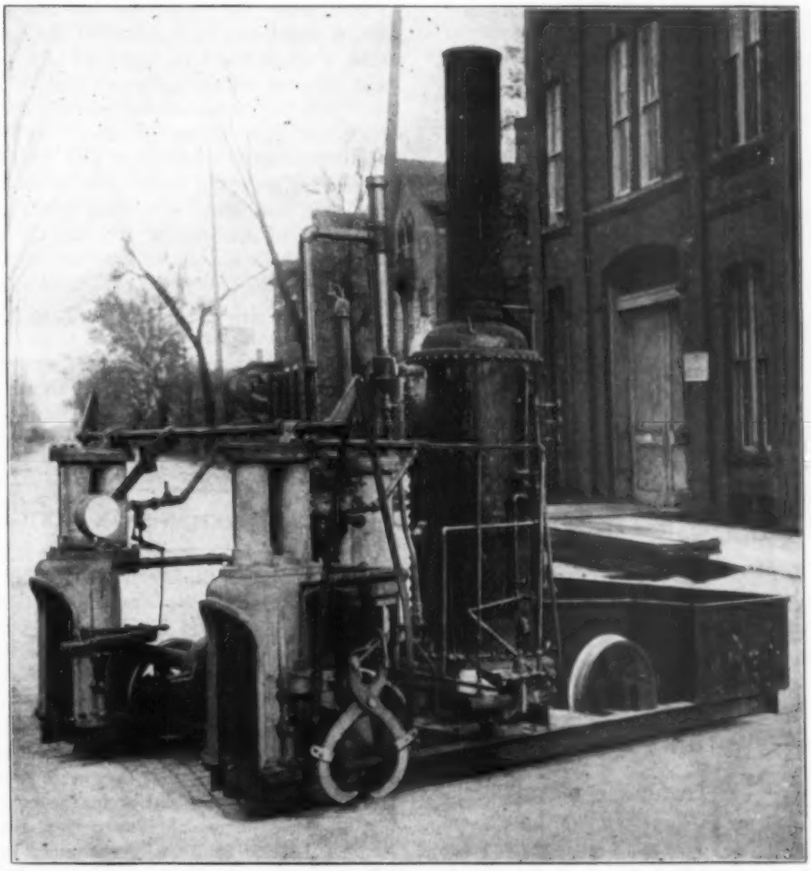
Australia has proportionately more churches than any other country, the number being 6,013 or 210 churches to every 100,000 people. England has 144 churches to every 100,000 and Russia 55 to the same number.

MACHINE FOR DRIVING SPIKES.

Millions of spikes have been used in building our railroads, and billions of strokes by strong arms have been needed to drive them. Now J. Verwin, track superintendent of the Detroit United Railway, has invented a machine which will drive as many spikes in a day as a small army of men. The spikes are straight driven, too, and the heads are not pounded off by that final tap which the average spike driver cannot resist.

The Street Railway Review, in its excellent issue of March 15, gives a detailed description of the machine:

This car is provided with a boiler, two steam hammers, and a pair of tongs opposite each hammer which are used for picking up the tie and holding it firmly against the rail to be spiked. The ties are held in position under the rail with a pressure of four tons and each hammer drives two spikes at the same time. The rail is held to the gauge by a cross bar in front of each hammer with a roller in each end of it. This gauge must be very accurate or the hammers will not hit the spikes. The two spikes at each end of the ties are driven home by two blows of the hammer when cedar ties are used. Two men with this machine can spike 1,200 ties per day, which amounts to a saving of $15 per day over hand labor. The car in use runs on the rails of the track being laid; in our illustration it was set out on the street pavement in order to get a good picture.



TRACK SPIKER—DETROIT UNITED RY.

FIND VALUABLE PEARL IN A CLAM.

Two men, Edwin Smith and William Stock, were digging clams in the Mississippi River between La Crosse and Lansing, Ia., a few days ago, when accidentally one of the clams was jostled from beneath the footboard of the boat in which they were riding. Smith was about to toss it over onto a pile of clams when Stock said that the clam might have brought good luck and advised that he open it. Smith did so and discovered a pearl valued at $2,400.

NOTHIN' DONE.

Winter is too cold fer work;
Freezin' weather makes me shirk.

Spring comes on an' finds me wishin'
I could end my days a-fishin'.

Then in summer, when it's hot,
I say work kin go to pot.

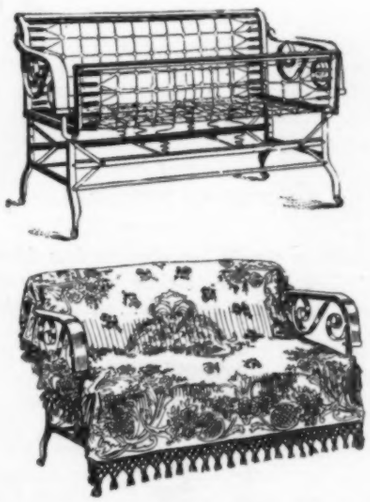
Autumn days, so calm an' hazy,
Sorter makes me kinder lazy.

That's the way the seasons run.
Seems I can't git nothin' done.

—March Lippincott's Magazine.

COMBINED CRIB AND DIVAN.

A furniture novelty this spring will be a metal crib which is easily changed to form a divan. For dwellers in flats or small houses or persons desiring to make



double use of a piece of furniture the plan will be welcome. As shown by letting down the gate at one side of the crib and throwing a rug or carpet over the seat the crib is converted into neat and comfortable settee.

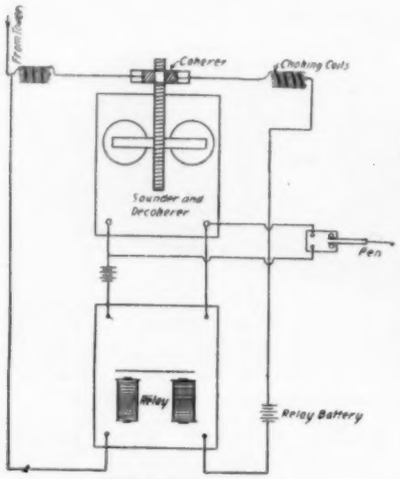
WOULD CONVERT NEW ORLEANS WATER WORKS INTO OIL WORKS.

According to reports from New Orleans, John W. Gates is negotiating for the purchase of the entire waterworks system of New Orleans for the purpose of transforming it into a huge system for the conveyance of oil. The waterworks are owned by a private corporation. Residents of New Orleans have not patronized the system to any great extent since the establishment, most of them obtaining their water supply from their "back-yard cisterns." Hence the giving up of the water pipes and plants to the proposed new usage would not work any great hardship on the people. Their is doubt, however, as to whether the underwriters and the city council will consent to the use of the water mains and pipes for conveying oil. Mr. Gates' plan is to convert the reservoir of the city of New Orleans water works which holds 20,000,000 gallons, into a huge tank for the storage of Beaumont oil, furnishing it to every house and factory in the city through the 500 miles of connecting mains. It is claimed that New Orleans could thus be supplied with fuel cheaper than any other city in the world.

What pies are very conducive to sleepiness?—Poppies.

WRITES WITH LIGHTNING.

Father Odenbach, of St. Ignatius College, Cleveland, O., who has long held a recognized foremost place among American scientists, has invented and set up in the meteorological observatory on the tower of the college building an instrument which records every flash of lighting within radius of nearly 100 miles. The apparatus is extremely complicated, and not easy of comprehension to one who has not a scientific education. The theory, however, is the same as that of the Marconi wireless telegraphy. The electric waves, coming from a great distance, or from near at hand, are collected and brought through a series of delicate appliances to a recorder, which notes each impression with a distinct



THE APPARATUS.

click, similar to the click of a telegraph instrument.

Father Odenbach's invention is absolutely unique in America, and the first lightning recorder ever devised or set up on this side of the Atlantic. An Italian named Boggio has worked out a scheme for this same purpose, but in practical working the instrument of Father Odenbach's is far its superior in every respect.

Under the conditions prevalent in the observatory the apparatus is simpler than that of Marconi's.

The "receiver" is enormous, consisting of the entire cap of the tower together with the four ribs extending down to four turrets, all of which are covered with sheet copper. From this mass of copper which is 400 to 600 feet, square, a wire is run down into the observatory, passing through a lightning arrester.

The apparatus consists, as shown in the engraving, of a relay of 150 ohms capacity, a sounder and two batteries.

A coherer is placed on the lever of the sounder and by this means the use of a decoherer and its shunt is obviated. There is no ground connection whatsoever.

From the sounder (see engraving), which gives the signal for the ear and which with every click decoheres the lodge tube, a shunt has been taken off to a second sounder, which has a pen attached to it. This pen automatically records every click on a revolving cylinder. As the tower cap is 150 feet high and thunder storms are generally at an elevation of 800 feet to a few miles, it is clear that there is plenty of opportunity for the electric waves to strike the copper sheet and record the number at a very great distance.

Along the lakes an instrument of this sort, in good working order, will be of considerable benefit to the shipping interests. Warning could be given by shore signal of impending thunder storms in time for crafts within reasonable distance of the shore to get into harbor.

AMERICAN FIREMEN SAVE MANILA.

The quality of the American volunteer to meet all emergencies was demonstrated by a recent big fire in Manila, that would probaly have destroyed the city but for the Americans. Capt. Harry L. Wells, of the Second Oregon Volunteers, who had served as a fireman at home, rushed to the engine house and found the Filipino crew all asleep. They said that they were tired from fighting the fire earlier in the evening, that the horses also were tired and could not possibly draw the engine, but that if the fire continued till morning they would again turn out and see what they could do. Capt. Wells said:

"That settled it. The lieutenant's men hitched up the team with lightning speed, and the 'too tired' horses went to the fire on the keen jump. Meanwhile the Filipine hose cart had been brought to the fire by its crew, stimulated by bayonets, but they could not be induced to go within two blocks of the blaze. From this cart I secured two lengths of hose and manned them with half a dozen men each. We then attacked the fire from my side of it and confined it."

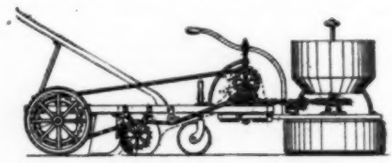
IMPROVED FEED BAG.

Horses should hereafter be firm friends of Geo. L. Dale, for he has invented a feed bag with room for air and which

permits of the grain being supplied only as fast as eaten. Every time the horse takes a mouthful he presses a valve which supplies more.

A SCRUBBING MACHINE.

No more house-maids' knee, for here is the sister to the parlor sweeper. John A. Nelson, of Saline, Kas., has settled this. His machine, which is set on wheels and pushed like a baby carriage, consists of a



tub of water which is regulated to supply the rotary scrubbing brushes below it. These are seen at the forward end. Between the wheels is a mopping drum which does the rest. Power is secured by sprocket chains to the rear wheels.

NEW SCISSORS FOR BARBERS.

Here is an invention which is intended to prove a great time saver to the barber. Its object is to provide a pair of scissors with a comb attached to stand in a position most convenient for use in lifting the hair without being in the way while the

shears are cutting it. Thus there is no necessity for transferring the two implements from one hand to the other during the operation. The patent on this device has been granted to Joseph Sansone of Des Moines, Iowa.

Last year Spain purchased from the United States $17,000,000 worth of merchandise, chief of which was raw cotton, more than ever before in the history of the two countries.

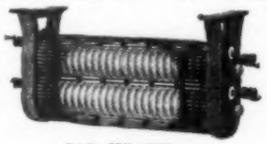
A national industrial exhibition under the auspices of the Imperial Government is now in progress at Osaka, Japan, and will continue until Aug. 1.

An international fishery exhibition will be held in Vienna from Sept. 6 to 21 in connection with the Eighth Austrian Fishery Congress.

HOW ELECTRIC HEATERS ARE MADE.

The use and control of heat is one of the marks of civilization. The savage has little need for other than the heat of the sun which in the tropics curls and kinks his hair even more effectually than the electrical device for the same purpose, which will be described later. The use of electricity as a heating agent came into notice with the development of the trolley car and was in fact largely the result of a positive demand. With the trolley came the production of electricity in such quantities and at such cost as had never been dreamed of. The street car manager rid of his horses was also anxious to find something better than a coal stove with which to heat his car. So the inventors set to work and the result is a system of electric heating from the most delicate nature up to entire buildings. We will describe some of the most interesting heaters.

ONE OF THE COILS.



CAR HEATER.

These heaters are of course all founded on the same general principle of securing heat by resistance, just as we saw a few weeks ago in the carborundum furnace. True they are in many different shapes, and some are quite small while others are very large, but they all have to get their heat by sending the electric current through wires where it does not like to go because the wires are specially chosen to make the flow as slow and difficult as possible. So the current in passing through, heats these wires and there is your electric heater.

We have chosen as the best examples of electric car heating, those made by the Consolidated Car Heating Co., of Albany, which now has its heaters in some 14,000 street cars. Each heater has two coils. These coils are made by taking a wrought iron rod ⅜ inch square on which are strung round porcelain tubes the entire length of the wire, so grooved that a helical grooves extends from end to end of the rod. The wire for the resistance coil is wound in a close spiral spring so as to get as many feet of wire as possible. It is then laid in this groove, and fastened at each end securely and copper wires attached to conduct the electric current. The wire used is a specially galvanized iron wire. The same amount of heat can be obtained in two ways: by a short coil of very high resistance or a longer coil of less resistance. A small stove would be red hot trying to heat a room which a big stove would do easily. But it is not well to have red hot heaters so a great many feet of wire are used to get as much surface as possible.

In Fig. 1 we show one of these coils completed ready to go into a heater. Fig. 2 is a heater complete ready to fasten under a car seat. Any number of heaters may be put in a car but six of them will heat the ordinary street car. If it is desired to have, say two degrees of heat, one for ordinary heating and another for colder weather, as in this latitude, then all the lower coils in all the heaters are connected by wires which lead to the switch and all the upper coils are connected in the same manner. When the switch is turned to "1" the lower set of coils heat; when turned to "2" the upper set of coils also heat. In some of the many types of heaters, especially large cars, there is provided still a third degree of heat. Fig. 3 shows the switch where the current is turned on and off. Fig. 4 shows the same switch with the cover removed. In cold weather as much power is often required to heat the car as to run it. The electric heater takes more coal in the engine room to heat the car than if the car was heated with stoves; but the advantage of safety, regulation, cleanness, and distribution of the heat make it altogether the more desirable. Current from a motor car is conducted to heat a trail car by connecting the two cars with an electric coupler, which is a ready method of connecting the wires of each by means of a plug and socket at the end of flexible wires. In this event the current comes down the trolley pole, is conducted to the trail car, goes through its heaters, from the heaters along wires to the car axles, thence through the wheels to the rails and so back to the generator at the power house. This is what causes the sparks which may be seen where the wheels of a trailer car touch the rails, especially when the track is dusty or has snow upon it.

Next week we will present an entirely different class of electric heaters and employed for a very different purpose.

REGULATING SWITCH WITH COVER REMOVED.

REGULATING SWITCH WITH COVER RENOVATED.

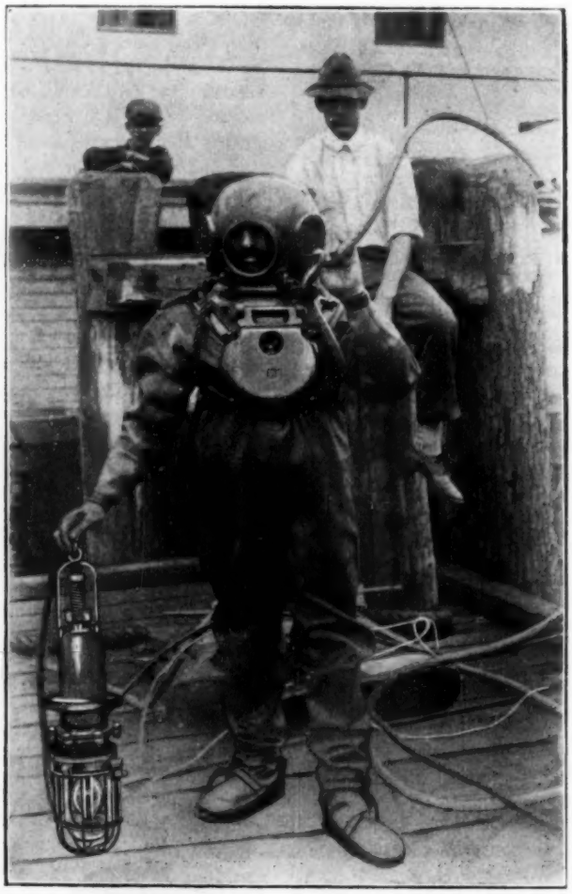
FARM SLIDING DOWN HILL.

A five-acre tract of land in Springville valley, California, with nearly a hundred people—men, women and children—residences, granaries and stock, is sliding down a hill. It was jarred loose by the earthquake of Feb. 9, and since has been making its way toward the Santa Ynez river. The moving field is part of the Solari estate, owned by James Kohler of Pasadena. After the earthquake that shook the Santa Ynez valley, a line of demarkation, the shape of a long elliptical curve, having the appearance of a newly plowed furrow, was noticed along the grain field above one of the low bluffs from corner to corner of the field. The space within the ellipse, five acres, is sliding away from the remainder of the hill at the rate of eight inches a week. The crevasse now formed is twelve feet wide at the surface and is several hundred feet deep.

THE "SUBMARINE SUN."

Lamp that Lights the Water for Toilers at the Bottom of the Ocean.

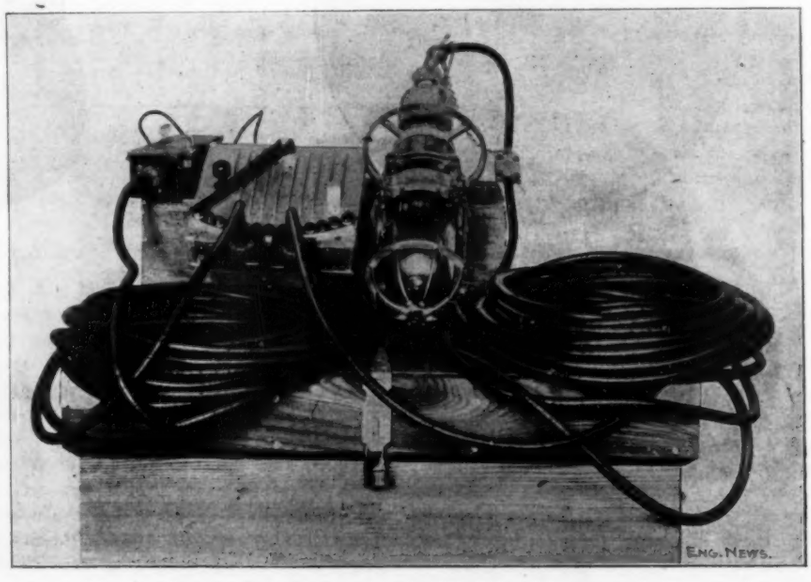
The once eternal darkness to human eyes at the bottom of the sea has been dispelled by the Yale Submarine Arc Lamp. now manufactured by the Naval Electric Co., 95 Liberty st., New York. The lower chamber of the lamp is inclosed in a glass globe, hermetically sealed to the upper chamber by rubber gaskets. Inside the lower chamber is an inner globe and the carbon. The glass globes withstand a pressure of 500 pounds, insuring safety at a depth of 1,000 feet. It will burn from 10 to 20 hours on one set of carbons. The lamp may be used wherever there is an electric current either from a storage battery or from a dynamo.



DIVER READY TO DESCEND WITH LAMP.

No longer is it necessary for that class of workers who earn their living toiling beneath the waves to grope their way in the ocean's perpetual night. The new arc light might be called "the submarine sun," for it performs the functions for man's benefit in the water that the sun does on the land. It lights the way for the diver, the submarine torpedo boat, and other submarine vessels. The modest inventor who withholds his name might be called the "Santos Dumont of the deep." He makes possible man's invasion of the realm of the fishes, while the noted aeronaut would acquaint us with the dominion of the birds.

It was the explosion of the Maine that led the way to the invention of the submarine arc lamp. At that time incandescent lamps were tried in the efforts to recover the wreck, but the light being of only 150 candle power on land was wholly inadequate. Experiments were begun in the laboratories of Yale which resulted in the submarine arc lamp of 2,000 candle power,



SUBMARINE ELECTRIC LIGHT WITH WIRES.

BOAT 2,000 YEARS OLD.

A wooden boat believed to be nearly 2,000 years old has been dug up in County Mayo, Ireland. The boat is beautifully carved from the trunk of an oak tree. It is 46 feet long and shows absolutely no signs of decay. The wood was so hard that hatchets scarcely made an impression on it. Excursions are now being organized to view this relic of Celtic handicraft. It will soon be taken to the Dublin museum.

HUGE SWINDLES IN FOODS.

Wholesale impositions on the public is revealed in Part X of "Foods and Food Adulterants," just issued by the government printing office. The report, however, fails to give the names of the prominent packers and others who are said to perpetrate the gigantic swindles. Of ten samples of potted chicken and turkey examined, five were found to contain a large admixture of pork. Game fowls, like the pheasant and the woodcock, appeared attractively on the label, but in the interior of the tin were nothing but barnyard chickens. "Wild Boar," which might almost excusably have been tame pig, was really beef. "Curry of Chicken a l'indienne" also turned out to be beef. In specimens of pate-de foie gras the enlarged goose livers had been replaced with beef and pork.

Having reached the age of sixty William C. Whitney, who has amassed a fortune of several millions, announces that he believes it is time to retire.

FOR THE MADAM.

Parsley may be kept for a long time by wrapping it in a piece of damp cheese cloth.

It adds to the flavor and digestibility of baked beans to add a half teaspoonful of mustard to the water that is poured over them after they reach the baking dish.

Silken fabrics should not be dampened before ironing and the iron should be but moderately warm.

Use stonemason's dust instead of soap for scouring kitchen tables and floors; it will make them beautifully white.

A rug that is getting old should have a backing of stout canvass sewed on it. This will help to strengthen it and will prevent its curling.

The women of St. Joseph's Catholic church, Hoboken, are conducting a novena of nine day's prayer to bring them husbands.

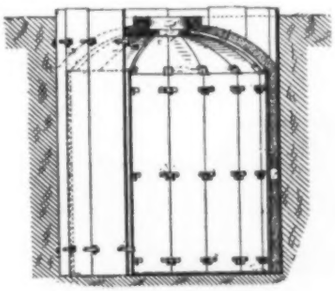
HOW TO PREPARE POTATOES.

Thin fried potatoes—Pare and cut raw potatoes very thin, with either the vegetable slicer or a sharp knife. Put them in cold water and let them stand in a cold place (the ice chest is best) from ten to twenty-four hours. This draws out the starch. Drain them well. Put about one pint in the frying basket, plunge into boiling lard, and cook about ten minutes. After the first minute set back where the heat will decrease. Drain and dredge with salt. Continue this until all are fried. Remember that the fat must be hot at first, and when it has regained its heat after the potatoes have been added must be set back where the potatoes will not cook fast. If the cooking is too rapid they will be brown before they have become crisp. Care must also be taken when the potatoes are first put in the frying kettle that the fat does not boil over. Have a fork under the handle of the basket, and if you find that there is danger, lift the basket partly out of the kettle. Continue this until all the water has evaporated; then let the basket remain in the kettle. If many potatoes are cooked in this way for a family, quite an amount of starch can be saved from the water in which they were soaked by pouring off the water and scraping the starch from the bottom of the vessel. Dry and use as any other starch.

Note.—The first of this issue of articles on How to Prepare Potatoes began with the issue of March 29.

PATTERN FOR CEMENT CISTERN.

The general use of cement has been applied in making cisterns instead of walling up with brick and plastering. The new way is quicker, cheaper than brick and lasts longer. The chief difficulty heretofore has been in retaining the cement in place until it sets. A recent invention provides a form outside of which the cement is placed. When hard the form, which is made in parts, can be taken down and is ready for use again. Any size cistern can be made with it.



THE AMERICAN WAY.

The radical difference between the intensity of purpose in America and England is illustrated in the following incident:

During the past year one of our large manufacturing establishments found its foreign trade growing so fast that it was advisable to be able to manufacture in England.

Bids were asked on the construction of a mammoth plant, but the best the English engineers could promise was completion of the works at the end of five years. Now five years to wait looks life a lifetime to a Yankee. What did the Americans do? Within two weeks a small army of engineers and foremen were on their way over and great quantities of building materials were loading in fast freight steamers. On arrival of the engineers, 2,000 workmen were employed, electric lights made day out of night and the work went forward like an express train.

In four months a great factory employing 1,200 men was "busy."

MUNCHES ROCK INTO MACADAM.

A machine that grinds stone with as much ease as a coffee mill grinds coffee is being used in tearing down the Lake Shore & Rock Island passenger station in Chicago. Great stones are piled into the hopper of the huge rock-munching machine and from an iron spout at the other side the fine macadam pours forth in a continuous stream. This is mixed into cement and goes to make the foundation of the new station.

Diluted ammonia will take orange stain out of woolen goods and restore the color.

GREAT DECEPTION IN SMOKERS' PIPES.

Few men who smoke a pipe know what it is made of. Many lovers of the meerschaum waste their breath against exceedingly deceptive imitations trying to color their high-priced treasure. Not one-twentieth of the pipes sold for meerschaum are real meerschaum. The literal translation of the word "meerschaum" means "foam of the sea," but in reality it it a silicate of magnesia. The raw material comes from Asia Minor. Pits from 25 to 120 feet deep are dug, and as soon as the vein is struck, horizontal galleries, sometimes of considerable length, are made. The stone, as extracted, is called ham-tash (rough block) and is soft enough to be easily cut with a knife. It is white and is covered with a red clay soil. The best quality is called "Spiegel meerschaum" (looking glass meerschaum) on account of its beautiful luster when colored.

Pipe manufacturers have been equally energetic in reproducing for unsuspecting smokers briar root pipes. There is not by half enough briar root in the world to supply material for one-third the pipes that are turned out annually under this name.

WIRELESS TELEGRAPHY ON THE LAKES.

Vesssls of all the principal steamship lines may soon be equipped with the wireless telegraph system. A practical demonstration is to be made about May 1 by Joseph S. Schwab, general manager of the Northwestern Wireless Telephone and Telegraph Company, of Chicago. Mr. Schwab said:

"My company is not operating the Marconi system, as has been reported. We own the Dolbear patent and the Shoemaker improvement on it, which makes it of practical use. This will be the system employed in the demonstration."

DOG DISCOVERS RICH ZINC MINE.

A zinc mine of immense wealth has been discovered in Kentucky by a dog. It is in Crittenden county, five miles from the town of Marion. The Rev. Dr. Charles Montgomery in telling of the discovery said:

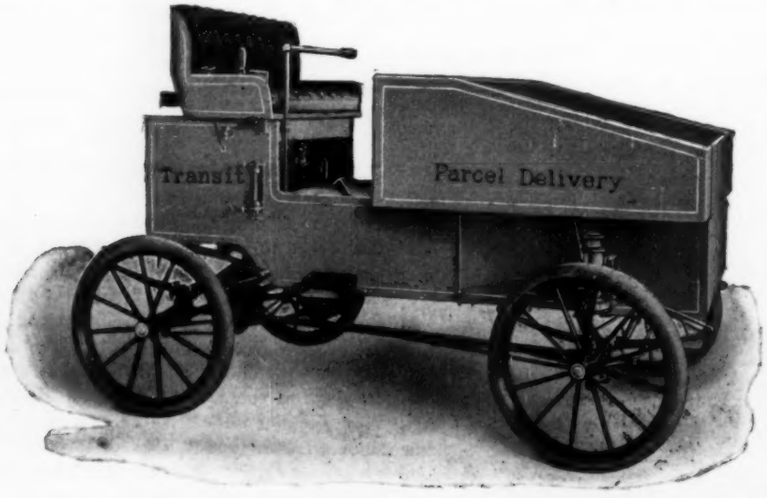
The dog chased a rabbit into the cleft of one of the cliffs near Crittenden Springs. In digging the rabbit out the boy found some peculiar mineral specimens. He took them to town and it was discovered that they were lumps of 'turkey fat' zinc, nearly 95 per cent pure."

A syndicate purchased land in the vicinity for $1,100. Now it has been found that a great stratum of rich zinc lies almost on the surface of the earth. The beds are apparently inexhaustible, and the investors expect to make millions of dollars.

AN AUTOMOBILE FOR RAILROAD OR CITY DRIVEWAYS.

Here is a vehicle that is equally at home on the boulevards of the city or in the wild-wood or mountainous flights of a railroad. It is the first vehicle ever built to run either on track or public highway. All

that is necessary to convert it from an automobile to a railroad inspection car is to take off the pneumatic-tired wheels and substitute the wheels containing inside flanges. It seats seven persons. The car is from the design of W. S. Rogers, vice-president of the Roller Bearing and Equipment of Company, of Keene, N. H. It was built by the Steamobile Company, of which Mr. Rogers is manager. The motive power may be either steam, gasoline or electricity. In front and beneath the driver's seat of the car illustrated is a six horse-power engine suplied by a straight shell boiler, with 428



tubes. It is equipped with a water tank of 36 gallons capacity and a 12-gallon gasoline tank. The engine cylinders are 3x3½ inches and power is transmitted by an extra-heavy 1¼-inch chain. It is equipped with an arrangement for super-heating the steam and no discharge is visible in the atmosphere at a temperature of 40 to 50 degrees. The weight is 1,400 pounds, and the wheel base 6 feet.

STEEL WOOL.

Steel wool is a patented article, made of fine threads of solid steel, and bears a resemblance to curled hair. It is intended as a substitute for sand and emery paper. It cuts more readily and uniformly than sandpaper, and does not as easily clog or gum up, says the Wood Worker. It adapts itself easily to the surface of carvings and moldings, and in corners where sand or emery paper could only be used with difficulty. It is therefore labor-saving. It is sold in various grades and commonly numbered as follows: No. 0, No. 1, No. 2, No. 3. These are all designated as steel wool. Then follow grades which are known as steel shavings, and coarse steel shavings. It is put up in packages of about 18 ounces each, 50 of which constitute a bale, the smallest quantity offered for sale.

What pies consider themselves quite swell?—Chappies.

PARLOR CAR BERTHS FOR DOGS.

"I want to engage a section in a Pullman from San Francisco to Chicago," said a dainty voice to a Chicago passenger agent a few days ago.

"How many in the party?" asked the agent.

"Seven," the woman replied.

"Seven!" gasped the agent, "and in one section? Impossible!"

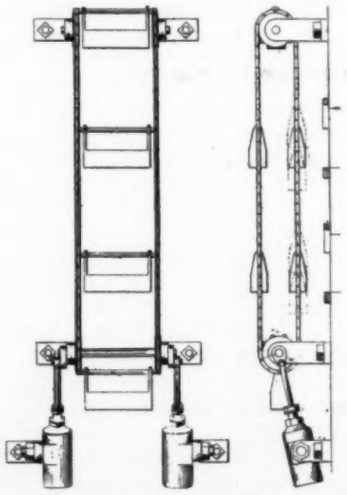
"Oh! No, it isn't," was the reply. "You see six of the party are dogs."

"That's different," said the agent, "but you'll have to get a permit and then buy a full rate ticket for each dog."

Without a murmur the woman handed over $545.50, and received the tickets for her dogs, which she sent on to her agent in San Francisco. The dogs were Japanese Spaniels, the property of Mrs. Charles A. White of Chicago. These spaniels are the most delicate dogs in the world. There are only fifteen of them in America, and they must have all the luxury that travel and home afford or they will die.

REGULATED FIRE ESCAPE.

A new fire escape has been devised by John Williams, of Belvidere, Ill. A pair of endless chains carrying small cars, each capable of holding one person, passes



around drums at the top and bottom. The lower drums has a crank which works a piston, moving in a cylinder, one end of which is V-shaped. In this a groove is cut. The compression of air when the apparatus is working causes the cars to descend very slowly.

Albany, N. Y., is indignant at the remarks of Mr. Carnegie who stated that he would give $175,000 for a library for the "not too highly developed City of Albany."

Some of the people here are making early garden. It is warm and ground in good order but very windy.—Rensselaer (Ind.) Journal.

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WASN'T VACCINATED ON THE ARM.

It was at a dinner party, says the Grocer's Criterion. The bright young man sat next to the young woman with beautiful arms and neck. The fair companion suddenly exhibited signs of nervousness. Two of his best jokes passed by unnoticed. Her face wore a look of alarm.

"I am in misery," she finally said.

"In misery?" echoed the man.

"Yes, I was vaccinated the other day and it has taken beautifully. I could almost scream it hurts so."

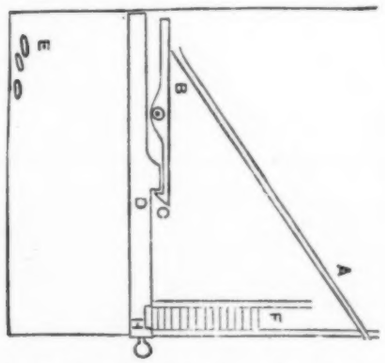
The young man looked at the beautiful arms; no signs there.

"Why, where were you vaccinated?" he asked, surprisingly.

"In Boston," she said, the smile chasing away the look of pain.

SLOT MACHINE.

A home made slot machine can easily be constructed by any bright boy handy with tools. Referring to the cut the gum or chocolate is stored at F; a hollow H in the drawer D enables the bottom chocolate to be drawn out. The drawer is locked by the catch on C on the trigger B. To unlock the drawer, a coin is passed down the



shute A, and its weight resting on the trigger B, lifts it. The drawer can then be pulled out. This allows the trigger B to fall still farther, and the coin drops into the till E. The shute A shoud be made to take the coin exactly, and the trigger B to require the exact weight of the coin to release the drawer. This makes fraud more difficult.

LARGEST OVEN IN THE WORLD.

The world's largest oven is in a temple in Rajputana in India. At the annual fair, or pilgrimage to the shrine of Kwajah Chisti, in the temple, this oven is filled with rice, butter, almonds, and spices, and a gigantic rice pudding is cooked by means of a furnace underneath. Eight pots filled to the brim are set aside for the entertainment of foreign pilgrims, and then certain privileged persons are allowed to empty the oven. To prevent them from being burnt by the scalding pudding they are wrapped from head to foot in thick cloths. When the oven is nearly empty another set of privileged people are allowed to enter, and these all tumble in pell-mell together and scrape the cauldron clean of its contents. The origin of this quaint custom cannot now be traced and though severe burns are the result of the struggle for the pudding no lives are ever lost, which is certainly a miracle, and is regarded as such by the pious Hindus.

What pies might bite you?—Puppies.

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FOR SALE—Job lot new electrical goods given us to sell; list for stamp. We handle everything electrical and at lowest prices. Stamp for catalogue. Dept. N., T. Binford Electric Works, 994 Washington Blvd., Chicago, Ill.

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BUSINESS CHANCES.

TO INVEST—If you have $2,000 to invest in first-class steam specialties and supply business, write me. Box 363, La Crosse, Wis.

FOR SALE—At ½ cost, Sanitarium of late Dr. Justin Hayes. Mrs. Justin Hayes, Western Springs, Ill.

CANADA—LEARN PRACTICAL BUSINESS—Netting me $8 daily for years; by mail. A. C. Smith, Lock Box 572 C, Windsor, Ont., Canada.

FOR SALE—Brewery; a great bargain. Moody, Keokuk, Ia.

FOR SALE—Good Barber Shop; established ten years. 365 Ogden Ave., Chicago, Ill.

FOR SALE OR EXCHANGE—122 acres all plow land in McHenry county; well fenced; good well and windmill; price $50 per acre. Address 400, Popular Mechanics.

WANTED—8-foot Robinson or Keene cornice brake. Geo. E. Roesch, Aurora, Ill.

WANTED—To buy a good second-hand engine, modern type, of not less than 150 nor more than 200-horse power. The Rood Lumber Company, Columbus, Ohio.

WANTED—Second-hand bran duster and 50 or 60 horse-power steam feed pump. Sam Howard, Howardstown, Ky.

HELP WANTED.

WANTED—Machine and Drill Hands. S., 150, Chicago Heights, Ill.

WANTED—Machinists. Six good Bench Hand Machinists. 1720 Old Colony Bldg., Chicago, Ill.

WANTED—Marker. Chicago Bridge & Iron Co., Washington Heights, Ill.

WANTED—Draftsman; map work; $12. Sasse & Dinwiddie, Crown Point, Ind.

WANTED—Copper Plate Printers. M. M. Bear Co., 57 Washington St., Chicago, Ill.

WANTED—First-class Journeymen Steam and Script Type Casters. Inland Type Foundry Co., St. Louis, Mo.

WANTED—Contractors; expert builders of concrete and rock dams; work waiting. Geo. D. Benson, Laporte, Ind.

WANTED—Experienced Scroll workers in iron and brass. Indiana Ornamental Iron Works, Shelby St., Indianapolis, Ind.

GOVERNMENT POSITIONS—Where they are and how obtained. Full particulars as to salaries, dates, places of examinations to be held soon in every state, etc., mailed free. Write for circular 123. Nat'l Cor. Inst., Washington, D. C.

DENTISTS—Two good dentists; must be all around men and rapid workmen; $20 per week to start. New York Dental Co., 74½ Riverside ave., Spokane, Wash.

Attractions for Next Week.

There is no use in talking, American people—and they are the greatest people in the world—do not like to read stuff that is not interesting to them. That is one reason why the American people are great. They pick out a subject that they have a natural liking for; read all they can find to read about it; learn all they can about it, and after a while know all there is to know about that subject and enlighten the rest of the world on it. Popular Mechanics is interesting and instructive and you do not have to waste your time when reading an article trying to figure out what it is talking about.

Would it not be awful if all the great skyscrapers of great cities would tumble down some day? That is what one man fears will result from corrosion of the iron. An article about it will be in the next issue.—The hum of the spinning wheel is once more heard in Ireland, since it is now the fad of kings and queens to wear Irish homespuns. Popular Mechanics will tell you about it.—Germans are great people at training animals. Their latest exhibition is a flea circus, in which the tiny insects draw miniature carriages, dance and fence. It is in the next issue.—But one of the strangest things science has discovered of recent days is that birds in migrating always travel with empty stomachs.—A gun that will shoot 25 miles has been invented.—A young clerk was about to be sent to jail recently when an automatic time recorder proved his innocence.—It may be that society women will wear trousers now because Lady McKenzie did so at a select luncheon in South Carolina a few days ago.—You will also want to know about the deadly sand storms of the American desert; how electric heaters are made; the origin of the tin soldier; a banquet of horse flesh, and a score of other topics just as interesting which will appear in Popular Mechanics next week. It is written so you can understand it.

MEXICO.—Wanted salesman to represent us in the States to sell our line of Mexican drawn work to the dry goods and notion trade. Charles Mandeh, Jr., Monterey, N. L., Mexico.

WANTED—Agents and salesmen; salary and expenses to hustlers; answer at once. Southern Contracting Co., Lake City, Fla.

WANTED FOR U. S. ARMY—Able-bodied, unmarried men between ages of 21 and 35; citizens of United States of good character and temperate habits, who can speak, read and write English. For information apply in person or by letter to recruiting officer, 194 S. Clark St., Chicago, Ill., or 16 Vermillion St., Danville, Ill.

MACHINISTS—Steady work for those who can earn good wages; state experience, etc. Address Submerged Electric Motor Co., Menomonie, Wis.

POSITIONS WANTED.

SITUATION WANTED—German Gardener and Florist wants position in private family. Charles Mink Altenheimer, Oak Park, Ill.

SITUATION WANTED—By Ice Machine Engineer; no brewery. Mathew Rocovich, 465 S. Paulina St., Chicago, Ill.

NEWSDEALERS
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YOUNG MAN of 25 wants position where he can learn electrical engineering. Has knowledge of higher mathematics and general drawing. J. Martz, 185 East Superior St., Chicago.

SITUATION WANTED—As Demonstrator, by lady; best references. 643 Harrison St., Chicago, Ill.

SITUATION WANTED—Swiss gentleman, good manager, expert bookkeeper, writing six languages, wants position. A. Borloz, 219 W. 11th St., New York City.

SITUATION WANTED—Engineer, 12 years' experience and well recommended. M. Shirts, 673 S. Talman ave., Chicago.

WANTED—If you are looking for a competent miller, one who understands the business, with years of experience, address J. B. Lindsay, Shelbina, Mo.

SITUATION WANTED—Printer; all-round newspaper and job compositor; state wages paid. Chas. Meyers, Berrien Springs, Mich.

SITUATION WANTED—Repair man, steamfitting machinist and electrical work; best references; reasonable wages. G. B., 6447 Parnell av., Chicago, Ill.

HARNESSMAKER—Good, single preferred, for all-around work; at once. H. Becker & Son, Polo, Ill.

CUBA—I will locate in Havana this year and want a general representation for machinery, tools and hardware specialties; well acquainted with languages and customs; references; bond if necessary. C. S. Lawrence, Box 814, New Orleans, La.

UNDERTAKER—Young single man of five years' experience in the furniture and undertaking business. Will furnish any state license. Address Fred L. Griswold, Delton, Mich.